REMARKS

Claims 1-18 have been withdrawn by the Examiner in light of the Applicants' response to the Restriction Requirement, claim 24 has been previously canceled, claim 15 being canceled and claim 30 being added by the claim amendments reflected above, the Applicants respectfully submit that claims 1-14, 16-23 and 25-30 are pending in the present application. The Applicants respectfully submit, therefore, that claims 19-23 and 25-30 remain under consideration on the merits in this application. The Applicants also respectfully contend that support for new claim 30 may be found in at least originally filed claims 1 and 19 and thus does not present the introduction of new matter.

Reconsideration of these claims in view of the remarks provided above and the arguments and comments provided below is kindly requested.

Rejections Under 35 U.S.C. § 102

Claims 19, 20, 23, 25, 26 and 29 stand rejected under 35 U.S.C. § 102(e) as anticipated by Raaijmakers *et al.*'s U.S. Pat. No. 6,780,704 ("Raaijmakers"). The Applicants respectfully traverse these rejections for the reasons detailed below.

The Applicants respectfully note that the paragraph including the cited portion of Raaijmakers with respect to the use of N_2O provides:

> In a second phase 111 of the cycle 115, a pulse 108 of an oxygen source gas is then provided to the workpiece. In the illustrated examples, the oxygen source gas comprises water vapor (H_2O) or ozone. Other suitable oxidants include: hydrogen peroxide (H_2O_2); methanol (CH_3OH); ethanol (CH_3CH_2OH), nitrous oxide (N_2O, NO_2); O radicals; etc. Radicals can be provided by remote plasma sources connected to the reaction chamber, and an ozone generator can similarly provide ozone (O_3). Preferably, the second phase 111 is maintained for sufficient time to fully expose the monolayer of metal complex left by the first phase 107 to

> the oxygen source gas. After a sufficient time for the oxygen source gas to saturate the metal-containing monolayer over the HSG silicon layer, shutting off the flow of the oxygen source gas ends the oxygen pulse 108. Preferably, carrier gas continues to flow in a purge step 110 until the oxygen source gas is purged from the chamber.

Raaijmakers, col. 13, lines 33-49. The Applicants respectfully submit that, when read in context, the only reference to plasma is limited to the generation of O radicals and cannot fairly be said to teach or suggest the use of a N_2O plasma. The remainder of Raaijmakers' disclosure is consistent with this interpretation, providing, for example:

> Exemplary process flows include alternately pulsed metal organic and oxygen ***source gases*** injected into a constant carrier flow,

Raaijmaker, Abstract (emphasis added), and

> After the metal source gas flow is stopped and purged by continued flow of carrier gas, ***a pulse of ozone*** is supplied to the workpiece. Ozone preferably comprises a sufficient percentage of the carrier flow, given the other process parameters, to saturate the surface of the metal-containing monolayer. The ozone readily reacts with the ethoxide-terminated surface of the metal-containing monolayer in a ligand-exchange reaction, forming a monolayer of tantalum oxide (Ta_2O_5). The reaction is limited by the number of available metal complexes previously chemisorbed. ***Neither ozone nor the carrier gas further reacts with the resulting tantalum oxide monolayer. Ozone causes the organic ligand to burn, liberating CO_2 and H_2O, and the monolayer is left with hydroxyl and oxygen bridge termination.*** The preferred temperature and pressure parameters, moreover, inhibit diffusion of ***ozone and reaction by-products*** through the metal monolayer ....

Raaijmakers, col. 16, lines 49-65 (emphasis added). The Applicants respectfully note that Raaijmakers consistently refers to the metal source material, the carrier material and the oxygen source material as gases and does not teach or suggest that one of more of these materials should be transformed into a plasma. The Applicants also notes that the disclosed ALD processes are characterized by Raaijmakers as relatively insensitive to pressure and reactant concentration, again indicating a conventional gas phase reaction. Raaijmakers, col. 14, lines 61-64. The

Applicants also note that a number of the oxygen source gas compounds identified by Raaijmakers, col. 13, lines 33-49, include the hydroxyl groups that this invention avoids during the oxidation process.

Accordingly, the Applicants respectfully maintain that Raaijmakers does not teach the use of a N_2O plasma as recited in claims 19 and 29 and does not, therefore, disclose each and every limitation of the pending claims. The Applicants contend, therefore, that Raaijmakers does not anticipate the claims identified above.

The Applicants respectfully request that this rejection be reconsidered and withdrawn accordingly.

Rejections under 35 U.S.C. § 103

Claims 20-22, 27 and 28 stand rejected as unpatentable over Raaijmakers in view of Callegari et al.'s U.S. Pat. No. 6,664,186 ("Callegari"). The Applicants respectfully traverse this rejection for the reasons detailed below.

The Applicants respectfully incorporate the discussion presented above with regard to the noted deficiencies of Raaijmakers. Turning to Callegari, the Applicants respectfully contend that this reference again includes no teaching or suggestion that that oxidant(s), with an explicit preference for water, are exposed to one or more metal alkoxides as a plasma. The Applicants respectfully contend, again, that neither of the applied references teach or suggest a N_2O plasma as the oxidizing species.

Further, the Applicants note that Callegari teaches that this oxidation should take place at temperatures preferably above 500 °C col. 6, lines 33-37. The Applicants respectfully note that

pending claim 25, conversely, limits the deposition steps b-e to temperatures between about 100 °C and 500 °C.

The Applicants also respectfully note that as indicated above, like Raaijmaker, Callegari teaches the acceptability of oxidants that include one or more hydroxyl groups. Callegari, col. 10, lines 27-33. Callegari also teaches that higher deposition temperatures improve the quality of the resulting dielectric layer. Callegari, cols. 7-8, Table 1. Accordingly, the Applicants respectfully submit that Callegari does not remedy the noted deficiencies of the primary Raaijmaker reference and would lead one of ordinary skill in the art to a method unlike that defined in Applications claims. The Applicants respectfully contend, therefore, that the applied references, whether considered individually or in combination, provide insufficient teaching and direction to have led one of ordinary skill in the art to the claimed method.

The Applicants respectfully request that this rejection be reconsidered and withdrawn accordingly.

New Claim 30

As noted above, the Applicants have introduced a new claim, claim 30, with the amendments to the claims reflected above. The Applicants respectfully submit that claim 30, which depends directly from claim 19, is allowable over the applied references for the reasons detailed above. The Applicants again also note the indication of acceptability, and indeed a preference for, oxidizing species that are not applied as a plasma and that include hydroxyl groups. Accordingly, the Applicants respectfully contend that claim 30 is allowable over the applied references.

CONCLUSION

Accordingly, in view of the above amendments and remarks, reconsideration of the rejections and allowance of each of claims 19-23 and 25-30 in connection with the present application is earnestly solicited.

Should there be any pending matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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